

SPECIFICATION  
TITLE OF THE INVENTION

# METHOD FOR MONITORING ACCESS TO A RESTRICTED-ACCESS SYSTEM, AND A RESTRICTED-ACCESS SYSTEM

## BACKGROUND OF THE INVENTION

Restricted-access systems are known, for example, in the form of pay-TV systems, in which pay television programs are received by the user only once an appropriate fee has been paid. Access to the pay-TV system is thus restricted to that user group which, for example, has set up a credit account (prepaid account) with

10 the service provider who is offering the television programs. A wide range of different types of identification measures are known in order to allow reception of television channels, which transmit such television programs, only by a user group for whom access is authorized. In this case, it must always be remembered that, in the television transmission field, the television picture is transmitted from one end,  
15 namely from the television transmitter to the television receiver, such as a domestic television set, without any form of back-channel.

Measures such as these are, for example, the setting up of specific decoders, also referred to as set-top boxes, which allow an encrypted TV signal to be received and to be decrypted.

20 A large number of access authorization or monitoring systems for  
21 encryption and decryption systems for transmitting digital or analogue TV programs  
22 are also known. The decrypting key is normally stored on a card, also referred to as  
23 a smart card, which the potential user must buy and push into a control device (set-  
24 top box) in order to use it. Such set-top boxes are costly and complicated to  
25 produce, and are thus associated with considerable hardware costs, owing to the  
complex asymmetric coding, which is based on security measures, of the television  
signals and the decryption (which is required for this purpose) via the control  
devices with the aid of a key on a smart card.

In consequence, the present invention is directed toward providing a method 30 for monitoring access to a restricted-access system, such as a pay-TV system, and of

providing a corresponding restricted-access system, which allows access to pay-per-view television programs in a simple and low-cost manner, without incurring high production costs.

#### SUMMARY OF THE INVENTION

5 A major aspect of the present invention is that a second telecommunications connection is set up (for example, via a mobile telephone) from the user to the service provider who provides the television programs. This second telecommunications connection is used to pass on an identifier from the control device, which the user intends to use, and various further information relating to  
10 individual user requests to the service provider, who then sends back a decoding key via the existing second telecommunications connection to the user's mobile telephone. The user can then enter the decoding key which he/she has read via an input device into the control device, and a processor device within the control device then uses a decoding algorithm to link the decoding key and the  
15 identification number of the control device to one another, and hence to calculate decoding information. This decoding information is applied directly by the control device to the television channel, at which point the latter is enabled with the desired television program. This advantageously results in the situation in which the control device does not need any complex decryption process for decrypting the encrypted  
20 television channel data, thus obviating a major proportion of the production costs for such a control device.

The process of setting up a second telecommunications connection via a mobile telephone even makes it possible for a type of back-channel to be set up to the transmission provider, thus allowing two-way communication between the user  
25 and the transmission provider. This communication may take place, for example, via a short message service message (SMS message), a Wireless Access Protocol (WAP) and/or by voice and tone dialing. It is thus possible to carry out a certain checking process between the transmission provider and the user, and the user need only respond to the questions asked of him/her by entering the appropriate  
30 responses in his/her mobile telephone.

Advantageously, each control device housing has a unique identification number printed on it as an identifier, which cannot be confused with that of any other control device. In consequence, when the user transmits this identification number to the transmission provider, this allows the decoding key, which is then

5 enabled by the transmission provider, to be used exclusively by a single control device; namely, that control device which has this identification number. The television channel with the associated television program can then be received only via this single control device. There is thus no point in passing on the decoding key to further users with other control devices for the other users.

10 In one preferred embodiment, a profile can be stored in the transmission provider, also referred to as the pay-TV server, which can also include a specific personal identification number (PIN) in addition to the control device identification number. Thus, not only a control-device-dependent identification number but also a user-dependent identification number can be entered, thus making it possible to

15 carry out access monitoring for a number of users in a restricted-access system. Family members can thus access certain television programs and television channels only when their personal identification number, which is stored in the service provider, allows this, depending on their age.

In a further embodiment, the processor device (chip) which contains the

20 decoding algorithm can be installed in the television set, so that the decoding key, which has been received on the mobile telephone, can be entered in the processor device via a remote control which is suitable for that television set. This allows the decoding key to be entered in a manner which is uncomplicated, quick and convenient.

25 It is also feasible for this decoding key to be entered via the Bluetooth data transmission technique, by transmitting it directly from the mobile telephone to the control device, without wires, so that the numbers forming the decoding key do not need to be entered once again.

Additional features and advantages of the present invention are described in, and will be apparent from, the following Detailed Description of the Invention and the Figures.

#### BRIEF DESCRIPTION OF THE FIGURES

5 Figure 1a shows a schematic illustration of a first embodiment of a control device for a restricted-access system in accordance with the teachings of the present invention.

Figure 1b shows a schematic illustration of a second embodiment of a control device for a restricted-access system.

10 Figure 2 shows a schematic illustration of the second telecommunications connection.

Figure 3 shows a flowchart of the method according to the present invention.

#### DETAILED DESCRIPTION OF THE INVENTION

15 Figure 1a shows a control device 1 having an identification number 2 printed on its housing, a chip 3 as a processor device and an input device 4 in the form of a keypad. Such a control device 1 is connected between the television set, on which the television program is shown, and an antenna input which receives the television channel with the associated television program. Each control device 20 designed in such a way has its own unique identification number which is normally printed on the housing of the control device.

A complex decoding algorithm is programmed in the processor device 3 and is responsible for linking the identification number of the appliance, which is already programmed in it, and the decoding key, which can be entered via the input device 4, with one another and then for enabling the television channel which is connected to the control device, in order to allow this to be received on the television set. Thus, all that is required is for the decoding code and the identification channel number to be linked to one another by the decoding algorithm, and there is thus no need for any complex decoding of encrypted television signals with the aid of a key on a smart card.

In a further embodiment as shown in Figure 1b, the input device can be replaced by a remote control 6 for television sets, which communicates with an interface 5 in the control device 1. This makes it possible for the user to enter the decoding key into the control device without needing to have direct contact with the control device. The control device can thus either entirely or partially also be installed in the television set, without needing to carry out any changes whatsoever to the housing of the television set.

5 A schematic illustration of the setting up of the second telecommunications connection 10 is illustrated, by way of example, in Figure 2. Such a

10 telecommunications connection 10 can be produced by a mobile telephone 12, which the user has, and the transmission provider 11, and they communicate with one another via a telephone connection. In this case, data which are used to ask the user for the identification number of the control device 1 and his/her program requests, and for television channel requests and offer requests can be transmitted to 15 the mobile telephone by SMS, for example. The user then enters the respective responses in the form of voice or tone dialing (VAD, DTMF), and sends such entered data from his/her mobile telephone to the transmission provider 11 via the second telecommunications connection 10. Such data also can be entered and transmitted via SMS and/or WAP.

20 Figure 3 shows the method according to the present invention for monitoring access to a restricted-access pay-TV system. For this purpose, in step 20, a predetermined telephone number, which the user knows, is first of all dialed on a mobile telephone, thus calling the transmission provider. When the transmission provider receives this call, it is registered (step 21). Then, in the steps 25 22 to 25 of a checking mode, the user transmits to the transmission provider the identification number 2 and the information about the program which he would like to watch, the desired television channel and the desired program offer or similar information. To do this, in step 22, the transmission provider sends the checking information to the user with the request for him to transmit the identification 30 number of the control device 1, the desired film and/or the desired television

channel and/or the desired television program offer. In step 23, the user receives this checking information via the mobile telephone and, in the form of a back-channel, sends the desired information and the identification number to the transmission provider, in step 24. The transmission provider receives the desired data in step 25.

5 In step 26, the transmission provider now checks whether the transmitted identification number has an associated credit account (prepaid account) via which payment for the desired film can be debited. If such a credit account exists, a check is carried out in step 27 to determine whether this credit account has sufficient 10 credit. If the credit account does not have sufficient credit, then, for example, the user is presented with a bill in step 29. Such billing also takes place if it is found, in step 26, that the identification number has no associated credit account.

15 However, if the credit account exists and has sufficient credit, then a decoding key is allocated, in step 28, to the corresponding identification number in conjunction with the desired film, the desired channel and/or the desired program offer. The transmission provider then sends this selected decoding key to the user, in step 30, once again by the second telecommunications connection 10. In step 31, the user receives the decoding key via the mobile telephone and, once this decoding key has been received, enters it, in step 32, into the control device (set-top box) 1 20 via the input device 4, via a remote control or the Bluetooth data transmission technique.

25 After entering the decoding key, the integrated chip uses its programmed, decoding algorithm to link the identification number and the decoding key with one another, and applies the decoding information obtained in this way to the television channel.

A simple and low-cost control device, therefore, can be produced in large quantities. There is no need for any smart card for decrypting the encrypted television channels, and complex scanning mechanisms for scanning such a smart card are likewise avoided, as are the logic and modem for setting up 30 telecommunications connections between the set-top box and the service provider.

The method features according to the present invention can be used for the restricted-access system according to the present invention to transmit television programs.

Although the present invention has been described with reference to specific 5 embodiments, those of skill in the art will recognize that changes may be made thereto without departing from the spirit and scope of the invention as set forth in the hereafter appended claims.